

**Appendix:**

**Extrinsic Information Supporting Applicants'  
Definition of Ordinary Level of Skill in the Art**

Person Name:

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Keyword



Company Name

Person Name

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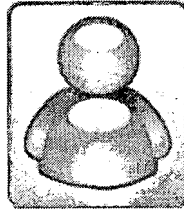
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**Mr. Joe Said**

This is Me  
**Gh's  
President  
and Chief  
Technology  
Officer**

### Joe's Zoom Network



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### Employment History



**Gh's  
President  
and Chief  
Technology  
Officer<sup>1</sup>**

### Web References

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#### 1. gh, LLC

www.ghbraille.com/nbia2004.html - [Cached]  
Published on: 4/26/2004 Last Visited:  
12/4/2006

Schleppenbach and Joe Said, gh's president and chief technology officer, formed the company at Purdue Research Park in February 2000 with assistance from the park's Gateways Program, which helps entrepreneurs transfer technology innovations into the private sector.

At Purdue University, Schleppenbach and Said developed computer software to automatically translate text into Braille by using Extensible Markup Language (XML).

From the start, Schleppenbach and Said decided to grow the company slowly, choosing to work with a local investor they met through Gateways rather than taking the venture capital route to financing.

#### 2. gh, LLC

www.gh7.com/nbia2004.html - [Cached]  
Published on: 4/26/2004 Last Visited:  
10/20/2006



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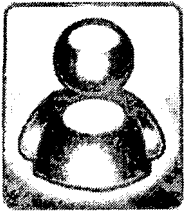
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**Mr. Joe P. Said** This is Me  
Founder

**Visions Lab Program**

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## Employment History

---

**Founder**  
Visions Lab Program

**Student**  
Purdue

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Web References:	2
Quick Lists:	0

## Web References

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### 1. 2004 MathSpeak Initiative

[www.gh-mathspeak.com/letterofsupport.php](http://www.gh-mathspeak.com/letterofsupport.php) - [Cached]  
Published on: 12/28/2005 Last Visited: 12/19/2006

gh is the product of the creative efforts of two former Purdue students: David Schleppenbach and Joseph Said.

...

While at Purdue both Mr. Schleppenbach and Mr. Said were actively involved in disability research. Mr. Schleppenbach, assisted by Mr. Said, founded the Visions Lab Program at Purdue a state of the art program for providing assistive technology to persons with disabilities.

...

While attending Purdue Mr. Schleppenbach and Mr. Said were encouraged by the Purdue Research Foundation, and the Purdue Gateways Program to use their groundbreaking research to start a new company. gh, LLC began in March of 2000 and has grown from four to its present level of 36 employees.

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### 2. Father knows best

[www.indystar.com/articles/9/156188-8379-105.html](http://www.indystar.com/articles/9/156188-8379-105.html) - [Cached]  
Published on: 6/20/2004 Last Visited: 6/20/2004

The company started as a two-person endeavor, with Schleppenbach and business partner Joe P. Said, 26, a former student at Purdue.

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Person Name:

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Keyword



Company Name

Person Name

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




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Name	Title	Company
Schleppenbach, Dave A. 	Board Member	Assistive Technology Industry Association
Schleppenbach, David A. 	Gh LLC's Founder and Chief Executive Officer	
Schleppenbach, Dave A. 	Chief Executive Officer	
Schleppenbach, Dave 	Graduate Student	Purdue University (past)
Schleppenbach, Dave 	Partner	
Schleppenbach, Dave 	Committee Member	CAST Inc
Schleppenbach, David 	Founder of Gh of Numerous Articles	
Schleppenbach, David 	Director	VISIONS Inc.
Schleppenbach, Dave 	Chemistry Student	

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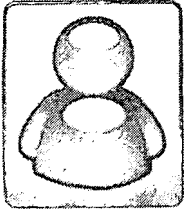
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**David A. Schleppenbach**  
This is Me  
**Gh LLC's Founder and Chief Executive Officer**

☒ Contact this person

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## Employment History

Gh LLC's Founder and Chief Executive Officer

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## Web References

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### 1. Cepstral Text-to-Speech

[www.cepstral.com/cgi-bin/news?page=2005-03-15-01](http://www.cepstral.com/cgi-bin/news?page=2005-03-15-01) - [Cached]  
Published on: 3/16/2005 Last Visited: 9/9/2006

"Ease of listening has been shown to have a huge impact on one's ability to learn and, therefore, voice quality directly affects the success of our software as a math and science learning tool," said David Schleppenbach, gh LLC's founder and CEO. "Cepstral's state-of-the-art Text-To-Speech (TTS) engine and voice technology helps our Mathspeak(tm) software talk more like a real human voice, making it easier to understand and promoting retention of the material."

Students with print disabilities, the majority of whom are visually disabled, have struggled for years to gain access to instructional materials in the fields of science, engineering, mathematics and technology. Human readers have been necessary to level the educational playing field for these students, but this strategy has not provided them with true access. "A spoken math equation that is read aloud can be interpreted to be one of several different equations," said Schleppenbach.

### 2. CoSN: The Consortium for School Networking

[www.cosn.org/about/press/012705.cfm](http://www.cosn.org/about/press/012705.cfm) - [Cached]  
Published on: 1/27/2005 Last Visited: 12/19/2006

"gh, LLC is excited to be a sponsor for CoSN's Accessible Technologies for All Students project," stated gh CEO and co-founder David Schleppenbach.

### 3. Bose McKinney & Evans - Attorneys, Indianapolis, Indiana

[www.boselaw.com/news\\_files/news404.asp](http://www.boselaw.com/news_files/news404.asp) - [Cached]  
Published on: 2/24/2004 Last Visited: 12/24/2006

"gh's goal is to implement solutions which utilize current technology to give greater access to print and electronic formatted materials to those who historically have had difficulty in obtaining and reading these documents," said David Schleppenbach, gh's CEO.

Founded in 2000, Schleppenbach said the company has goals of growing to \$10 million in revenue and 75 employees by 2008.

### 4. PRESS RELEASE gh's MathSpeak(TM) Finds Its "Voice" With Pittsburgh Speech Synthesis Company

[www.marketwire.com/mw/release\\_html\\_b1?release\\_id=8](http://www.marketwire.com/mw/release_html_b1?release_id=8) - [Cached]

Published on: 3/16/2005 Last Visited: 3/16/2005

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#### **5. Red Wing Republican Eagle**

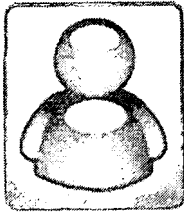
[www.republican-eagle.com/site/news.cfm?brd=1253&de](http://www.republican-eagle.com/site/news.cfm?brd=1253&de) - [Cached]

Published on: 4/10/2002 Last Visited: 4/10/2002

"gh's solutions have helped government agencies accelerate their section 504 and 508 initiatives, and have given higher education institutions the capability to fulfill the large demand for accessible textbooks," says Dave Schleppenbach, Co-Founder and CEO.

Tornado(TM) marks the breakthrough of a superior Braille translation process that can deliver Braille documents with greater speed and more accuracy than any existing translation process.

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**David A. Schleppenbach**  
This is Me  
**Gh LLC's Founder and Chief Executive Officer**

Contact this person

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## Employment History

Gh LLC's Founder and Chief Executive Officer

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[www.marketwire.com/mw/release\\_html\\_b1?release\\_id=8](http://www.marketwire.com/mw/release_html_b1?release_id=8) - [Cached]

Published on: 3/16/2005 Last Visited: 3/16/2005

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# U.S. Department of Labor

## Bureau of Labor Statistics

Occupational Outlook Handbook



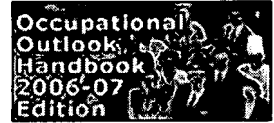
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## Computer Software Engineers

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[Working Conditions](#)  
[Training, Other Qualifications, and Advancement](#)  
[Employment](#)  
[Job Outlook](#)  
[Earnings](#)  
[Related Occupations](#)  
[Sources of Additional Information](#)

### SIGNIFICANT POINTS

Computer software engineers are projected to be one of the fastest growing occupations over the 2004-14 period. Very good opportunities are expected for college graduates with at least a bachelor's degree in computer engineering or computer science and with practical work experience. Computer software engineers must continually strive to acquire new skills in conjunction with the rapid changes that are occurring in computer technology.

### NATURE OF THE WORK

[\[About this section\]](#)

[Back to Top](#)

The explosive impact of computers and information technology on our everyday lives has generated a need to design and develop new computer software systems and to incorporate new technologies into a rapidly growing range of applications. The tasks performed by workers known as computer software engineers evolve quickly, reflecting new areas of specialization or changes in technology, as well as the preferences and practices of employers. Computer software engineers apply the principles and techniques of computer science, engineering, and mathematical analysis to the design, development, testing, and evaluation of the software and systems that enable computers to perform their many applications. (A separate statement on [engineers](#) appears elsewhere in the *Handbook*.)

Software engineers working in applications or systems development analyze users' needs and design, construct, test, and maintain computer applications software or systems. Software engineers can be involved in the design and development of many types of software, including software for operating systems and network distribution, and compilers, which convert programs for execution on a computer. In programming, or coding, software engineers instruct a computer, line by line, how to perform a function. They also solve technical problems that arise. Software engineers must possess strong programming skills, but are more concerned with developing algorithms and analyzing and solving programming problems than with actually writing code. (A separate statement on [computer programmers](#) appears elsewhere in the *Handbook*.)

*Computer applications software engineers analyze users' needs and design,*

construct, and maintain general computer applications software or specialized utility programs. These workers use different programming languages, depending on the purpose of the program. The programming languages most often used are C, C++, and Java, with Fortran and COBOL used less commonly. Some software engineers develop both packaged systems and systems software or create customized applications.

*Computer systems software engineers* coordinate the construction and maintenance of a company's computer systems and plan their future growth. Working with the company, they coordinate each department's computer needs—ordering, inventory, billing, and payroll recordkeeping, for example—and make suggestions about its technical direction. They also might set up the company's intranets—networks that link computers within the organization and ease communication among the various departments.

Systems software engineers work for companies that configure, implement, and install complete computer systems. These workers may be members of the marketing or sales staff, serving as the primary technical resource for sales workers and customers. They also may be involved in product sales and in providing their customers with continuing technical support. Since the selling of complex computer systems often requires substantial customization for the purchaser's organization, software engineers help to explain the requirements necessary for installing and operating the new system in the purchaser's computing environment. In addition, systems software engineers are responsible for ensuring security across the systems they are configuring.

Computer software engineers often work as part of a team that designs new hardware, software, and systems. A core team may comprise engineering, marketing, manufacturing, and design people, who work together until the product is released.

## **WORKING CONDITIONS**

**[About this section]**

 **Back to Top**


Computer software engineers normally work in well-lighted and comfortable offices or laboratories in which computer equipment is located. Most software engineers work at least 40 hours a week; however, due to the project-oriented nature of the work, they also may have to work evenings or weekends to meet deadlines or solve unexpected technical problems. Like other workers who sit for hours at a computer, typing on a keyboard, software engineers are susceptible to eyestrain, back discomfort, and hand and wrist problems such as carpal tunnel syndrome.

As they strive to improve software for users, many computer software engineers interact with customers and coworkers. Computer software engineers who are employed by software vendors and consulting firms, for example, spend much of their time away from their offices, frequently traveling overnight to meet with customers. They call on customers in businesses ranging from manufacturing plants to financial institutions.

As networks expand, software engineers may be able to use modems, laptops, e-mail, and the Internet to provide more technical support and other services from their main office, connecting to a customer's computer remotely to identify and correct developing problems.

## **TRAINING, OTHER QUALIFICATIONS, AND ADVANCEMENT**

**[About this section]**

 **Back to Top**

Most employers prefer to hire persons who have at least a bachelor's degree and broad knowledge of, and experience with, a variety of computer systems and

technologies. The usual degree concentration for applications software engineers is computer science or software engineering; for systems software engineers, it is computer science or computer information systems. Graduate degrees are preferred for some of the more complex jobs.

Academic programs in software engineering emphasize software and may be offered as a degree option or in conjunction with computer science degrees. Increasing emphasis on computer security suggests that software engineers with advanced degrees that include mathematics and systems design will be sought after by software developers, government agencies, and consulting firms specializing in information assurance and security. Students seeking software engineering jobs enhance their employment opportunities by participating in internship or co-op programs offered through their schools. These experiences provide the students with broad knowledge and experience, making them more attractive candidates to employers. Inexperienced college graduates may be hired by large computer and consulting firms that train new employees in intensive, company-based programs. In many firms, new hires are mentored, and their mentors have an input into the performance evaluations of these new employees.

For systems software engineering jobs that require workers who have a college degree, a bachelor's degree in computer science or computer information systems is typical. For systems engineering jobs that place less emphasis on workers having a computer-related degree, computer training programs leading to certification are offered by systems software vendors. Nonetheless, most training authorities feel that program certification alone is not sufficient for the majority of software engineering jobs.

Persons interested in jobs as computer software engineers must have strong problem-solving and analytical skills. They also must be able to communicate effectively with team members, other staff, and the customers they meet. Because they often deal with a number of tasks simultaneously, they must be able to concentrate and pay close attention to detail.

As is the case with most occupations, advancement opportunities for computer software engineers increase with experience. Entry-level computer software engineers are likely to test and verify ongoing designs. As they become more experienced, they may become involved in designing and developing software. Eventually, they may advance to become a project manager, manager of information systems, or chief information officer. Some computer software engineers with several years of experience or expertise find lucrative opportunities working as systems designers or independent consultants or starting their own computer consulting firms.

As technological advances in the computer field continue, employers demand new skills. Computer software engineers must continually strive to acquire such skills if they wish to remain in this extremely dynamic field. For example, computer software engineers interested in working for a bank should have some expertise in finance as they integrate new technologies into the computer system of the bank. To help them keep up with the changing technology, continuing education and professional development seminars are offered by employers, software vendors, colleges and universities, private training institutions, and professional computing societies.

## **EMPLOYMENT**

### **[About this section]**



**Back to Top**

Computer software engineers held about 800,000 jobs in 2004. Approximately 460,000 were computer applications software engineers, and around 340,000 were computer systems software engineers. Although they are employed in most industries, the largest concentration of computer software engineers—almost 30 percent—are in computer systems design and related services. Many computer software engineers also work for establishments in other industries, such as software publishers, government agencies, manufacturers of computers and related

electronic equipment, and management of companies and enterprises.

Employers of computer software engineers range from startup companies to established industry leaders. The proliferation of Internet, e-mail, and other communications systems is expanding electronics to engineering firms that are traditionally associated with unrelated disciplines. Engineering firms specializing in building bridges and powerplants, for example, hire computer software engineers to design and develop new geographic data systems and automated drafting systems. Communications firms need computer software engineers to tap into growth in the personal communications market. Major communications companies have many job openings for both computer software applications engineers and computer systems engineers.

An increasing number of computer software engineers are employed on a temporary or contract basis, with many being self-employed, working independently as consultants. Some consultants work for firms that specialize in developing and maintaining client companies' Web sites and intranets. About 23,000 computer software engineers were self-employed in 2004.

## JOB OUTLOOK

[\[About this section\]](#)

 [Back to Top](#)

Computer software engineers are projected to be one of the fastest-growing occupations from 2004 to 2014. Rapid employment growth in the computer systems design and related services industry, which employs the greatest number of computer software engineers, should result in very good opportunities for those college graduates with at least a bachelor's degree in computer engineering or computer science and practical experience working with computers. Employers will continue to seek computer professionals with strong programming, systems analysis, interpersonal, and business skills. With the software industry beginning to mature, however, and with routine software engineering work being increasingly outsourced overseas, job growth will not be as rapid as during the previous decade.

Employment of computer software engineers is expected to increase **much faster than the average** for all occupations, as businesses and other organizations adopt and integrate new technologies and seek to maximize the efficiency of their computer systems. Competition among businesses will continue to create an incentive for increasingly sophisticated technological innovations, and organizations will need more computer software engineers to implement these changes. In addition to jobs created through employment growth, many job openings will result annually from the need to replace workers who move into managerial positions, transfer to other occupations, or leave the labor force.

Demand for computer software engineers will increase as computer networking continues to grow. For example, the expanding integration of Internet technologies and the explosive growth in electronic commerce—doing business on the Internet—have resulted in rising demand for computer software engineers who can develop Internet, intranet, and World Wide Web applications. Likewise, expanding electronic data-processing systems in business, telecommunications, government, and other settings continue to become more sophisticated and complex. Growing numbers of systems software engineers will be needed to implement, safeguard, and update systems and resolve problems. Consulting opportunities for computer software engineers also should continue to grow as businesses seek help to manage, upgrade, and customize their increasingly complicated computer systems.

New growth areas will continue to arise from rapidly evolving technologies. The increasing uses of the Internet, the proliferation of Web sites, and mobile technology such as the wireless Internet have created a demand for a wide variety of new products. As individuals and businesses rely more on hand-held computers and wireless networks, it will be necessary to integrate current computer systems with this new, more mobile technology. Also, information security concerns have given rise to new software needs. Concerns over "cyber security" should result in businesses and government continuing to invest heavily in software that protects

their networks and vital electronic infrastructure from attack. The expansion of this technology in the next 10 years will lead to an increased need for computer engineers to design and develop the software and systems to run these new applications and integrate them into older systems.

As with other information technology jobs, employment growth of computer software engineers may be tempered somewhat as more software development is contracted out abroad. Firms may look to cut costs by shifting operations to lower wage foreign countries with highly educated workers who have strong technical skills. At the same time, jobs in software engineering are less prone to being sent abroad compared with jobs in other computer specialties, because the occupation requires innovation and intense research and development.

## EARNINGS

[\[About this section\]](#)

 [Back to Top](#)

Median annual earnings of computer applications software engineers who worked full time in May 2004 were about \$74,980. The middle 50 percent earned between \$59,130 and \$92,130. The lowest 10 percent earned less than \$46,520, and the highest 10 percent earned more than \$113,830. Median annual earnings in the industries employing the largest numbers of computer applications software engineers in May 2004 were as follows:

Software publishers	\$79,930
Management, scientific, and technical consulting services	78,460
Computer systems design and related services	76,910
Management of companies and enterprises	70,520
Insurance carriers	68,440

Median annual earnings of computer systems software engineers who worked full time in May 2004 were about \$79,740. The middle 50 percent earned between \$63,150 and \$98,220. The lowest 10 percent earned less than \$50,420, and the highest 10 percent earned more than \$118,350. Median annual earnings in the industries employing the largest numbers of computer systems software engineers in May 2004 are as follows:

Scientific research and development services	\$91,390
Computer and peripheral equipment manufacturing	87,800
Software publishers	83,670
Computer systems design and related services	79,950
Wired telecommunications carriers	74,370

According to the National Association of Colleges and Employers, starting salary offers for graduates with a bachelor's degree in computer engineering averaged \$52,464 in 2005; offers for those with a master's degree averaged \$60,354. Starting salary offers for graduates with a bachelor's degree in computer science averaged \$50,820.

According to Robert Half International, starting salaries for software engineers in software development ranged from \$63,250 to \$92,750 in 2005. For network engineers, starting salaries in 2005 ranged from \$61,250 to \$88,250.

## RELATED OCCUPATIONS

[\[About this section\]](#)

 [Back to Top](#)

Other workers who use mathematics and logic extensively include computer systems analysts, computer scientists and database administrators,

computer programmers, computer hardware engineers, computer support specialists and systems administrators, engineers, statisticians, mathematicians, and actuaries.

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Additional information on a career in computer software engineering is available from the following organizations:

Association for Computing Machinery (ACM), 1515 Broadway, New York, NY 10036. Internet: <http://www.acm.org>

Institute of Electronics and Electrical Engineers Computer Society, Headquarters Office, 1730 Massachusetts Ave. N.W., Washington, DC 20036-1992. Internet: <http://www.computer.org>

National Workforce Center for Emerging Technologies, 3000 Landerholm Circle S.E., Bellevue, WA 98007. Internet: <http://www.nwcet.org>

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 [Back to Top](#)

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